DOCUMENT RESUME

ED 411 981 PS 025 832

AUTHOR Grundmann, M.; Teo, Thomas
TITLE Socialization, Intelligence, and Cognitive Competence.
PUB DATE 1997-04-00
NOTE 12p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (62nd, Washington, DC, April 3-6, 1997).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *Adolescents; Age Differences; Child Rearing; *Children; Cognitive Development; Developmental Tasks; Discipline; *Family Environment; Foreign Countries; Grade Point Average; Intelligence; Intelligence Quotient; Longitudinal Studies; Mediation Theory; Parent Child Relationship; Piagetian Theory; Social Differences; *Socialization; Socioeconomic Status
IDENTIFIERS Cognitive Competence; Iceland; Parenting Styles

ABSTRACT

This longitudinal study examined the multiple influences of social class and family socialization on intelligence at age 7, and on the development of cognitive competence from age 7 through age 15 in a sample of 121 urban Icelandic children and adolescents. Socialization condition was defined as sources of parental support and control strategies, with a supportive factor indicating highly discursive, culturally oriented, person-centered, and communicative family climate; while a restrictive factor indicated authoritative control. Social class was based on nature of work, education, and income. Intelligence was assessed with the Raven-IQ at age 7. Cognitive competence was measured at 7, 9, 12, and 15 years by aggregated scores on a battery of Piagetian tasks. Results showed a significant correlation between intelligence and social class that was strongly mediated by family socialization conditions. There was no significant effect of social class for cognitive competence; however, there was a general trend of increasing competence with increasing class position, mediated by family socialization conditions. In lower social classes, restrictive socialization conditions suppressed cognitive competence while supportive socialization conditions in upper classes fostered cognitive competence. With increasing age, the variance in cognitive competence increased. Until 12 years, the influence of family socialization showed additive or partly mediated influences of intelligence at age 7. Intelligence at age 7 had the strongest impact on cognitive competence; at later ages the impact was mediated by the developmental process. Both intelligence and cognitive competence were directly and indirectly affected by class specific socialization conditions. (Contains 11 references.) (KB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Socialization, intelligence, and cognitive competence

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 411 981

M. Grundmann
Max-Planck-Institute for Human Development and Education
Berlin, Germany

&

Thomas Teo
York University
Ontario, Canada

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
M. Grundmann
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

PS 025832

BEST COPY AVAILABLE

Introduction

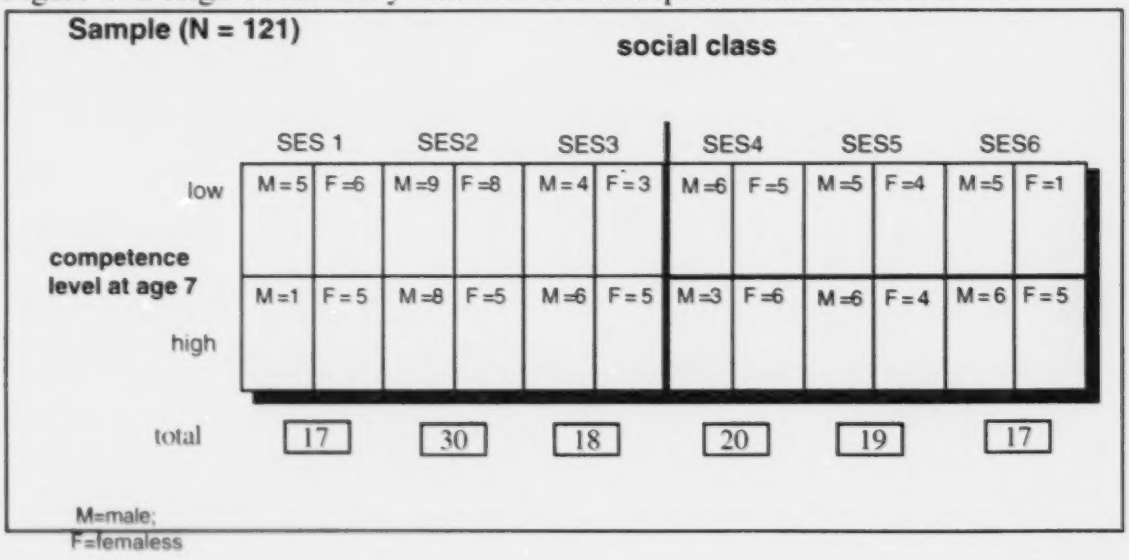
Within Piaget's framework cognitive socialization can be understood as resulting from interaction between internal structures of the mind and representations of experiences in the subjects lifeworld contexts (Edelstein, 1996). Socialization conditions orient subjects towards particular objects and procedures of knowledge. Activities of families are part of these conditions. Thus, socialization conditions within the family which include orientation, selection, definition, interpretation, and organization of epistemic objects, can be interpreted as indicators of children's experiences.

Socialization research has identified, on the one hand, lifeworld and family interactions that enhance the variability of experience encountered by the subject as well as openess towards experience. On the other hand research demonstrated the existence of contexts that restrict opportunities for experience. Such contexts are represented, for example, by social class or insecurity of attachment. In various studies it has become clear that rather than specific family variables patterns of family socialization conditions are important for the development of cognitive competence. These patterns emerge as multidimensional and multivariate functions of social class and types of family interaction that constitute the communicative structure of the family (Bronfenbrenner, 1993; Sigel, Stinson, & Kim, 1993; Burleson, Delia, & Applegate, 1995). The multiple influences of social class and family socialization on intelligence at age 7, and on the development of cognitive competence from age 7 trough 15 are described in the present poster.

Method

Subjects: The present analyses are based on a longitudinal study of urban Icelandic children with a focus on the relationship of social structure and individual development (Edelstein, Keller & Schröder 1990). The sample was stratified according to social class, gender and general ability. The sampling design maximizes the likelihood that the data disclose systematic developmental differences due to important socio-structural factors and contexts of childhood experience. The project aims at studying the relationship between macro-contexts and the micro-processes of individual development, and purposts to integrate a sociologically based socialization perspective with a psychological view of developmental dynamics.

Figure 1. Design of the study "Individual development and social structure"



Variables: Socialization variables such as the educational level of the parents, leisure activities, social networks, parents' activities with the child, and rearing styles were assessed at the age of 7 years. In agreement with the literature, family *socialization conditions* (see Table 1) are interpreted as sources of parental support and control strategies (Rollins & Thomas 1979; Delia, Burleson & Applegate).

The multidimensional, multivariate structure of class specific socialization patterns of supportive and restrictive family conditions is extracted by nonlinear multivariate analysis. This method takes into account the overall variance of variables with different levels of measurement in a multidimensional space (see Gifi, 1991; Van DeGeer, 1993; Grundmann 1995). The extracted socialization patterns are described in Table 1.

Table 1: Component loadings of socialization variables and social classes (Nonlinear multivariate analysis; n=121)

	loadings	
variables	support	restrictivity
social class 1. dimension	.66	-.34
social class 2. dimension	-.32	.71
educational level	.61	-.58
cultural orientations	.45	-.22
network (friends)	.49	-.20
network (colleagues)	.52	.08
self-direction/conformity (Kohn-scale)	.53	.16
activities with the child	.57	.36
verbal-supportive rearing styles	.43	.31
punitive-restrictive rearing styles	.27	.54
control over school activities	.12	.61
control over leisure activities	.18	.33
time for the child	.01	.37
Pct % explained variance	19.8	15.4

The supportive factor indicates a highly discursive, culturally oriented, person-centered and communicative family climate, while the restrictive factor indicates authoritative control techniques.

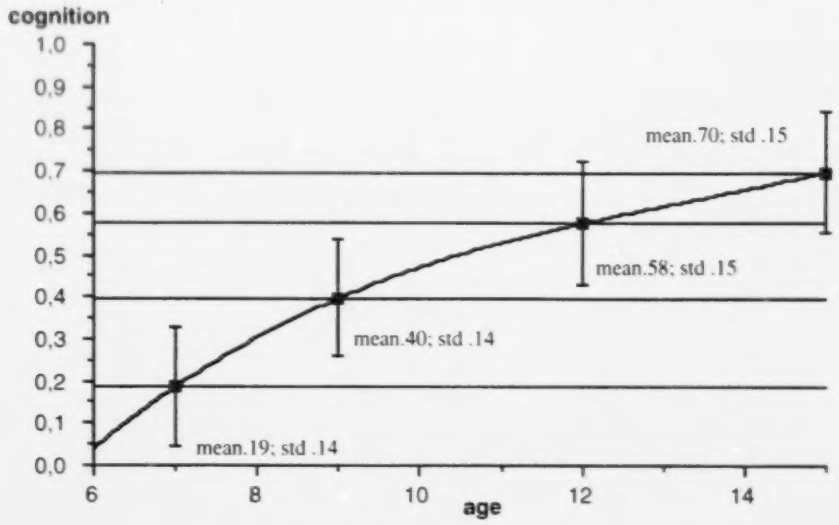
Social class was measured using the method developed by Edelstein & Björnsson. Nature of work, education, income are classified into six social classes: 1. Unskilled manual workers, 2. skilled manual workers, 3. lower service (unskilled clerical workers and civil servants) and 4. upper service class (technical, teaching and lower managerial), 5. business, managerial and entrepreneurial, 6. academic professional class. Because of its multinominal level of measurement, social class is located on both dimensions. Therefore it can´t be summarized to one socialization factor.

BEST COPY AVAILABLE

While the socialisation patterns will be introduced in the further analysis as sum-scores, social classes are introduced as dummies.

Intelligence was assessed with the *Raven-IQ* test at age 7 (mean = 24,6; std = 7,0). *Cognitive competence* was constructed as an aggregated score across a battery of Piagetian tasks. Tasks of conservation, experimental class inclusion, class inclusion with verbal categories, and logical multiplication were administered in childhood, while with increasing developmental age multiple compensation, syllogistic reasoning, isolation of variables and the pendulum task were presented in adolescence. Thus, the aggregated score is based on the assumption that tasks for assessing concrete operation will be solved adequately in adolescence while tasks for assessing formal operation cannot be solved in childhood (Teo & Schröder, 1991). The score at each measurement point (7, 9, 12, and 15 years) consists of the addition of the mean of each concept (assessed by several tasks), divided by the number of concepts. Thus, the aggregate score range between "0" and "1." (see poster "Teo, Schröder & Edelstein).

Figure 2. Means and standard deviations for cognitive competence at ages 7, 9, 12 and 15 (aggregate score)



BEST COPY AVAILABLE

Results

Social class, family socialization and IQ

Figure 3 describes the variations of intelligence between the social classes. The bold trace represents Raven scores without the intervening influences of socialization conditions on intelligence. The broken line represents the Raven score when mediating influences of socialization are taken into account. The figure illustrates a significant correlation between intelligence and social class (main effect = F 2.3, P. = > .05) that is strongly mediated by family socialization conditions (support = F. 5.1; P = > .05; restrictiveness = F 4.1, P > .05; social class = F .22; P > .95).

Figure 3: Class-specific variations of Raven-IQ by socialization conditions

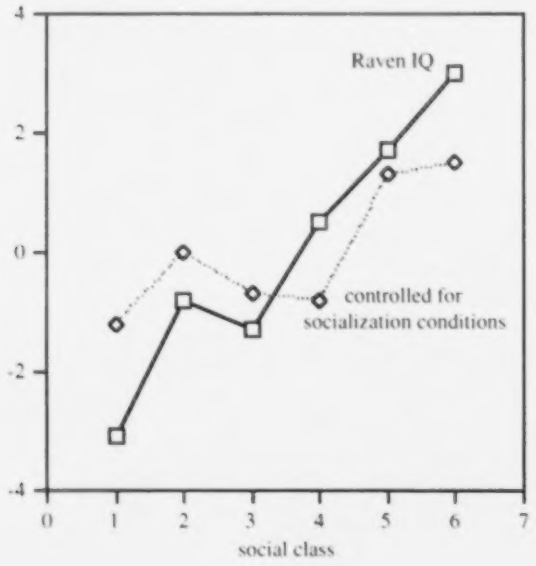
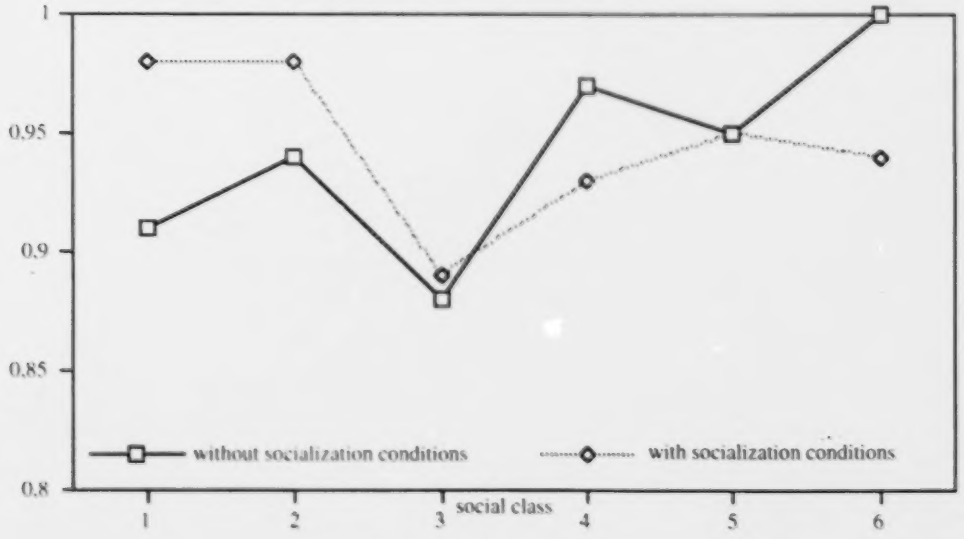


Figure 4 describes class specific variations in cognitive competence for different social classes (across all ages). It shows that social class and cognition vary in nonlinear fashion. For that reason, **no** significant effect of social class for cognitive competence was found. However, a general trend of increasing competence with increasing class position emerges rather clearly in the graph. The mean level of cognitive competence across ages is lowest in classes 1 and 3, reaches middle level in classes 2 and 5, and is highest in classes 4 and 6.

This class-specific variation of cognitive competence is mediated by family socialization conditions. The low level of cognitive competence in classes 1 and 2 as well as the higher level in classes 4 and 6 are due to class-specific socialisation conditions. We can conclude that in lower social classes restrictive socialisation conditions suppress cognitive competence (restrictivity = β -.24*) while supportive socialisation conditions in the upper classes foster cognitive competence (support = β .33**).

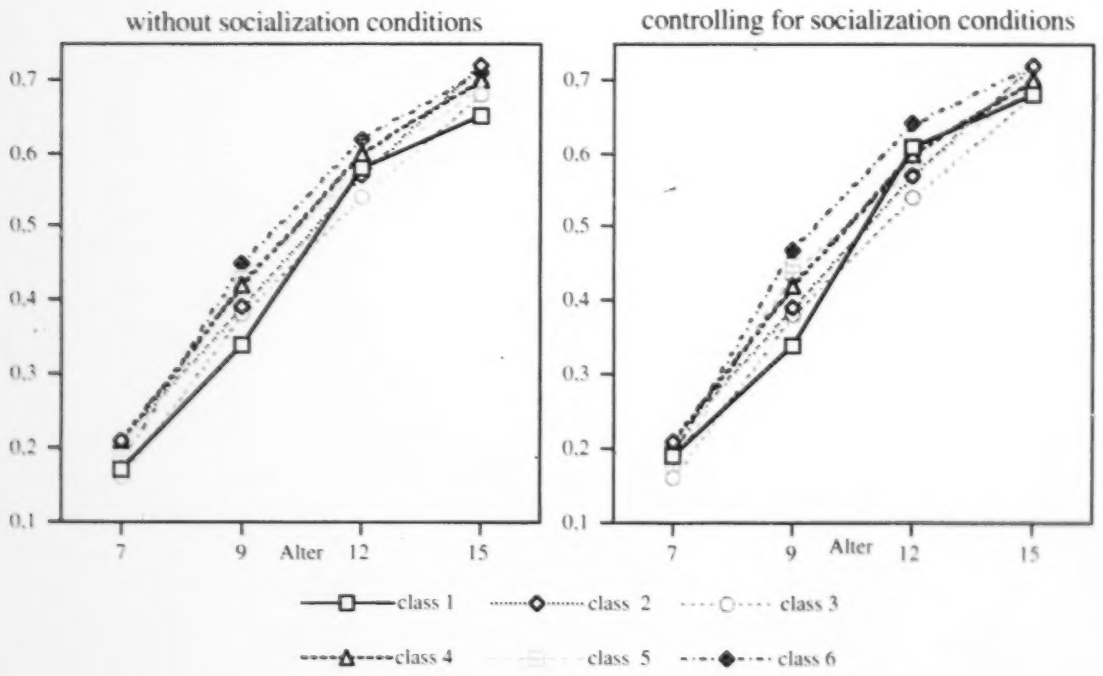
Figure 4: Standardized means of cognitive competence in different social classes across all measurements; with (bold line) and without (broken line) controlling for socialization conditions



BEST COPY AVAILABLE

To describe the longitudinal patterns and progressions of class-specific competence, figure 5 shows the class specific variations of cognitive competence at the different ages. The overlapping and differential developmental curves (i.e. class 1 between ages 9 and 12) partly explain why social class appears to have little impact on cognitive development. Figure 5 also shows that at age 7 (transition to concrete operations) the variance in cognitive competence between social classes is low, while with further development the variance in cognitive competence increases. At age 15 formal operations leads to relative equalization of cognitive competence between social classes.

Figure 5: Development of cognitive competence at age 7, 9, 12 and 15 in different social classes; with and without socialization conditions



BEST COPY AVAILABLE

Hierarchical regression analysis provides deeper insights into the partial effects of social class (step 1), family socialization (step 2) and intelligence (step 3) on cognitive competence (through which early levels are controlled at step 4).

Table 2: Hierarchical regression of cognitive competence at ages 7, 9, 12, and 15 on social class, familiy socialization, and Raven-IQ (β-weights)

	age 7			age 9				age 12				age 15			
analytical steps/ variables	1	2	3	1	2	3	4	1	2	3	4	1	2	3	4
class 1	Referencegroup														
class 2	.12	.08	.03	.20	.16	.18	.16	-.12	-.13	-.11	.18	.12	.07	.11	.11
class 3	.07	.02	0	.13	.08	.10	.11	-.07	-.20	-.17	.19	0	-.05	.0	.08
class 4	.09	-.03	-.05	.26+	.14	.16	.19	0	-.19	-.17	.19	.05	-.06	.03	.02
class 5	.08	0	-.08	.30*	.23	.20	.24*	-.01	-.12	-.14	.17	0	-.06	-.06	.01
class 6	.12	-.03	-.11	.33**	.21	.18	.23*	.11	-.10	-.12	.13	.08	-.02	-.02	.04
restrictiveness		.21*	-.13		-.16	-.09	-.05		-.29**	-.24**	-.17*		.10	-.01	.15
support		.25*	.05		.23*	.05	.02		.40**	.24*	.19*		.23*	.06	-.08
Raven-IQ at age 7			.61**			.55**	.33**			.45**	.08			.44**	-.04
competence at age 7							.36**				.34**				.26*
competence at age 9											.30**				.23*
competence at age 12															.50**
R	.09	.28	.63	.29	.37	.63	.69	.18	.43	.60	.73	.11	.23	.47	.79
r^2	.01	.08	.40	.09	.14	.39	.47	.03	.19	.36	.54	.01	.05	.22	.62
r^2 change		.07*	.32**		.05+	.26**	.08**		.16**	.17**	.18**		.04	.17**	.40**
F	.18	1.29	8.6	1.7	2.1*	7.3**	8.9**	.61	3.0**	6.3**	10.1**	.24	.71	3.0**	12.1**

p+.10;*.05;**.01

The results replicate the age specific variations of cognitive competence between social classes as shown in figure 5. Children in the upper classes 4, 5 and 6 possess significantly higher cognitive competencies at age 9 than children in the reference group (class 1; see step 1). Because this effect decreases when controlling for socialization conditions, it can be seen as mediated by these conditions (step 2).

Until the age of 12 years the influence of family socialization shows additive, or partly mediated influences of intelligence at age 7 (i.e. effects of earlier competence

BEST COPY AVAILABLE

on later cognitive competence). Only at age 15 the socialization effects decrease. This may be the effect of the increasing power of peer and school influences in adolescence. Intelligence at age 7 has the strongest impact on cognitive competence. At later ages this impact is mediated by the developmental process itself. Both intelligence and cognitive competence are directly and indirectly affected by class specific socialisation conditions.

Summary

In general, the results highlight the impact of family socialization on intelligence and the development of cognitive competence. In spite of a sizeable effect of intelligence on the development of cognitive competence, family socialization conditions have a major impact on intelligence and cognitive competence mediating class specific opportunities of experience. Interestingly, family socialization has a larger impact on intelligence than on cognitive competence. From a cognitive point of view, this result indicates one advantage of Piaget's approach to cognition over traditional measures of intelligence: Piaget's tasks are less prone to social influences. On the other hand, one has to admit that family socialization conditions still have an impact on cognitive competence, mediating class specific opportunities of experience. Further, it is not amazing - from a cognitive developmental perspective - that there is a sizable effect of intelligence on the development of cognitive competence. Nevertheless, the results show the importance of a theory of cognitive socialization emphasizing that lifeworld-supported exploration enhances cognitive development whereas contexts that control and restrict the child's activities may limit the growth of cognitive competence.

References

Björnsson, S., Edelstein, W. & Kreppner, K. (1977): Explorations in social inequality. Stratification dynamics in social and individual development in iceland. Max-Planck-Institute for human development and education, stuies and reports, No 38, Berlin

Burleson, B. R., J. G. Delia, J. L. Applegate (1996): The Socialization of Person-Centered Communication. In: M. A. Fitzpartick; A. L. Vangelisti (eds): Explainung family interactions, Sage.

Bronfenbrenner, U. (1993). The Ecology of Cognitive Development. In: Wozniak, R. H. & Fischer, K. W. (Hrsg.), *Development in Context. Acting and Thinking in Specific Environments* (S. 3-44). Hillsdale: Erlbaum.

Edelstein, W., Keller, M. & Schröder, E. (1990). Child Development and Social Structure: A Longitudinal Study of Individual Differences. In: Baltes, P. B., Featherman, D. L. & Lerner, R. M. (Hrsg.), *Life-Span Development and Behavior* Band 10 Hillsdale, NJ: Erlbaum.

Edelstein, W. (1996). The social construction of cognitive development. In: Fischer, K. & Noam, G. (Hrsg.), *Development and vulnerability in close relationships* (S. 91-112). Hillsdale: Erlbaum.

Gifi, A. (1990). *Nonlinear Multivariate Analysis*. New York: John Wiley & Sons.

Grundmann, M. (1995): Exploring patterns of socialisation conditions and human development by nonlinear multivariate analysis. Poster presented at the 1995 SRCD-Convention, Indianapolis.

Rollins, B. C. & D. L. Thomas (1979): Parental support, power, and control techniques in the socialization of children. In: W. R. Burr et al (eds): Contemporary theories about the family by research-based theories, New York: The free press,

Van deGeer, J. P. (1993). *Multivariate Analysis of Categorical Data: Applications*. Newbury Park: Sage.

Sigel, I. E., Stinson, E. T. & Kim, M.-I. (1993). Socialisation of Cognition: The Distancing Model. In: Wozniak, R. H. & Fischer, K. W. (Hrsg.), *Development in Context. Acting and Thinking in Specific Environments* (S. 211-224). Hillsdale: Erlbaum.

Teo, T. & Schröder, E. (1991). *Latente Wachstumsmodelle der kognitiven Entwicklung: Ein Modellversuch* . In: Beiträge aus dem Forschungsbereich Entwicklung und Sozialisation. Berlin: Max-Planck Institut für Bildungsforschung